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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Bruce K. Winker

For: MONOLITHIC OPTICAL COMPENSATION FOR IMPROVED VIEWING ANGLE IN LIQUID CRYSTAL DISPLAYS

Serial No: 08/313,532

Filed: 30 September 1994

Group Art Unit: Unknown

#6

Examiner: Unknown

Atty Dkt: 94CR110

CERTIFICATE OF MAILING (37 C.F.R. 1.8)

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231, on the date below.

10 MAY 95
Date

Signature

Coe F. Miles
Printed Name

Honorable Commissioner of Patents and Trademarks
Washington, DC 20231

PETITION FOR ACCELERATED EXAMINATION PURSUANT TO 37 C.F.R. § 1.102

Sir:

Assignee requests the above-captioned patent application be granted accelerated examination in accordance with 37 C.F.R. § 1.102(d). Pursuant to M.P.E.P. § 708.02, a preliminary search was performed by the European Patent Office (EPO) and a copy of the EPO search report is attached. An Information Disclosure Statement and associated PTO Form 1449, with copies of the cited the references, are filed contemporaneously with this petition.

In accordance with 37 C.F.R. §§ 1.102(d) and 1.17(i)(2), a check in the amount of $ 130.00 is enclosed. If the check is for the incorrect amount or is missing, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayments, to Deposit Account No. 01-2508/TOE.

Petition was charged on IDS.

ROCL:013

REVIEW OF SEARCH REPORT CITATIONS

It is noted that the European Search Report classifies all of the cited references as only being *Technological Background* (type A). The assignee agrees with this assessment. Thus, following a summary of the instant invention, abstracts from each cited reference will be given. This, it is believed, sufficiently highlights the technical distinctions between the instant invention and the cited references.

Summary of Instant Invention. The instant invention is directed to a monolithic O-plate optical compensator device. The disclosed optical compensator comprises a plurality of thin-film compensation layers that are deposited on a single substrate in a liquid crystal display. The term "monolithic" is meant to imply that the O-plate and other thin-film compensator layers are formed by depositing (e.g., via solvent casting or vacuum deposition) one layer on top of another layer; with or without the use of surface modification treatments such as adhesion layers, alignment layers, and the like.

Murata et al., *Liquid Crystal Device Having Compensator and Thin Film With Maximum Refractive Index Parallel and Perpendicular to Compensator, Respectively,* U.S. patent no. 5,311,340, issued 10 May 1994. The EPO search report identifies Murata et al. as a type A (*technological background*) reference with respect to claims 1, 2 and 4 through 10. In abstract:

> Disclosed is a liquid crystal display device including a liquid crystal cell in which a twisted nematic liquid crystal is interposed between a pair of transparent electrodes disposed opposite to each other, a pair of polarizers, an optically compensating element having a maximum refractive index in a direction in the plane thereof, and a thin film having a maximum refractive index in the direction of the thickness thereof, the optically compensating element and the thin film being interposed between the liquid crystal cell and the polarizer so as to substantially satisfy specific conditions. This liquid crystal display device offers an improved viewing angle and is advantageously used in a black and white liquid crystal display.

Iimura et al., *Super-Twisted Nematic Type Liquid Crystal Displays Device,* U.S. patent no. 5,184,237, issued 2 February 1993. The EPO search report identifies Iimura et al. as a type A (*technological background*) reference with respect to claims 1 through 3 and 8. In abstract:

> A liquid crystal cell display device including a liquid crystal cell comprising a pair of substrates having transparent electrodes and aligning films, a liquid crystal composition with a positive dielectric anisotropy positioned between the substrates, major axes of the liquid crystal molecules being aligned nearly parallel in a plane parallel to the substrate when a field is applied and the liquid crystal molecules being twisted in an angle of 120° to 360° in a direction perpendicular to the substrate; a pair of polarizers positioned on opposite sides of the cell; and one or more birefringent layers positioned between the cell and at least one of the polarizers in which a maximum refractive index directions at a planes contacting the polarizer and the liquid crystal cell, are tilted with respect to a plane parallel to the substrate, angles made between each of the directions and the parallel plane are symmetrical [sic] one another with regard to a plane parallel to the substrate when angles made between the substrate and maximum refractive index directions positioned between the contacting planes of the birefringent layers are continuously distributed.

Haas, Gunther, *Device for a Helical Nematic Liquid Crystal Display,* European patent document 0 576 342 A1, published 29 December 1993 for Thompson Consumer Electronics. **(Translation of EPO patent document provided by the Assignee.)** The EPO search report identifies Gunther as a type A (*technological background*) reference with respect to claims 1 through 3. In abstract:

> The invention relates to devices for display with electronic control which use the properties of rotation of polarization of a helical nematic liquid crystal layer. The invention relates to a display device which comprises an optical cavity formed by two polarizers (2, 5), which contains a helical nematic liquid crystal layer and with which uniaxial birefringent material (11) is associated to compensate for the residual birefringence of the liquid crystal layer which tends to decrease the contrast ratio of the display device. The optical axis (OA) of this uniaxial

birefringent material is slightly slanted with respect to the line normal to the principal sides of said layer. Thus the uniformity of the angular distribution of the contrast ratio is improved compared to a device which lacks a compensatory means. The invention can be applied notably to means for the display of data for computers and for direct display or the display by projection of television images.

Arakawa, *Liquid Crystal Display*, European patent document 0 367 288 A2, published on 9 May 1990 for Fuji Photo Film Co., LTD. The EPO search report identifies Arakawa as a type A (*technological background*) reference with respect to claim 2. In abstract:

A liquid crystal display comprising a liquid crystal cell and a polarizing sheet is disclosed in which (A) at east one film having light transmission properties, said film (A) having at least one optic axis at an angle of not more that 45° with the normal thereof or satisfying the relationship: $\eta_{TH} - (\eta_{MD} + \eta_{TD})/2 > 0$ wherein η_{TH} is a refractive index in the normal direction; η_{MD} is a refractive index in the machine direction; and η_{TD} is a refractive index in the transverse direction, and (B) at least one uniaxially stretched film of a polymer having a positive intrinsic birefringence and light transmission properties are inserted between the liquid crystal cell and the polarizing sheet. Viewing angle dependence of retardation of the display can be eliminated, and the display has markedly widened viewing angle.

Emsworth, GB *Achromatic Retardation Layers Based on Anisotropic Polymer Networks*, Research Disclosure, No. 337, 1992, pp. 411. The EPO search report identifies Emsworth as a type A (*technological background*) reference with respect to claims 2 and 4. In abstract:

Densely crosslinked oriented polymer networks can be made by the in-situ photopolymerization of liquid-crystalline (LC) diacrylates [1]. The films or coating obtained are characterized by a high birefringence Δn. . . It is known from literature [2] that when the dispersion of Δn values of the distinct stack materials is chosen differently, achromatic wave plates can be produced. It is

the aim of this publication to produce achromatic wave plates by means of the photopolymerization process of LC diacrylates. the object of this process is that such a wave plate can be integrated in a variety of optical components simply as coating material or as optically functional adhesive.

Respectfully submitted,

Date: 10 MAY 95

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